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AFGL ltr dtd 7 Sep 1982

E-SYSTEMS
Montek Division

Report No. 131500-620
12 August 1977

SALT FOG TEST REPORT
FOR THE
AN/TRN-41 TACAN NAVIGATIONAL SET

Prepared for:
Department of the Air Force
Headquarters Electronic Systems Division(AFSC)
Hanscom Air Force Base
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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

AN/TRN-41 TACAN NAVIGATIONAL SET

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes the salt fog test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

SALT FOG TEST REPORT

for the

NAVIGATIONAL SET, TACAN, AN/TRN-41

This report describes the salt fog test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41, 131500-415.

1. Test Identification. Salt fog test as defined in Appendix IV-F (salt fog test procedure) of the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41.

2. Functional Purpose of Test. This test forms a part of the AN/TRN-41 system qualification tests.

3. Test Objectives. To demonstrate that the AN/TRN-41 will meet the salt fog requirements of paragraphs 3.2.5.1.5 and 4.2.1.4.3.6 of Specification No. 404L-701-5017A, Part I of 2 parts (20 August 1976).

4. Description of Test Article. The AN/TRN-41 system consisting of the following was used for the tests:

Receiver-Transmitter	RT-1202/T
Antenna	AS-3132/T
Antenna Support	AB-1237/T
Filter, DC Power	F-1439/T
Interconnecting Cables	

5. Summary of Test Results. The AN/TRN-41 showed no functional degradation during the salt fog test. Some parts showed rust during the test. This was further degradation from the humidity tests.

6. Description of Test Facilities and Procedures. The test facilities and test procedures are described in Appendix IV-F of the Equipment Test Plan.

7. Test Setup Diagrams. The test setup diagrams are provided in Appendix IV-F of the Equipment Test Plan.

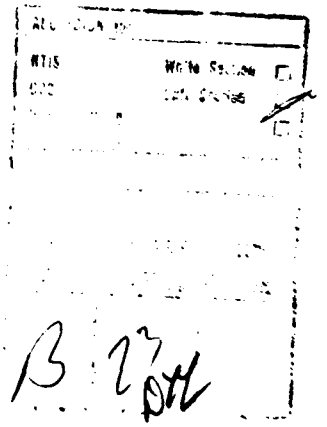
8. Test Equipment. See Attachment 1 for test equipment used for the salt fog test and the pretest, test and post test operational tests.

9. Test Data. Attachment 2 contains the data sheets for the salt fog test, pretest, test and post test operational tests.

10. Test Conditions. The system was in a salt fog chamber at 35°C with a salt fog being applied for 48 hours.

11. Test Results Analysis. Comparison of pretest, test and post test operational data showed no functional degradation during the salt fog test. Some parts as described on the salt fog test data sheet in Attachment 2, exhibited rust. These parts were expedited for use on the preproduction systems and did not meet the requirements of the specification control drawings. The parts used on production will have proper corrosion resistant characteristics.

12. Certification. The data sheets shown in Attachment 2 have been signed by a Montek Quality Assurance representative and a DCAS representative, certifying that the test results are authentic, accurate, current and in accordance with the related test plan.



ATTACHMENT 1

TEST EQUIPMENT

TEST EQUIPMENT

Description/Manufacturer	Model	Calibration Due Date
Oscilloscope, Tektronix	465	7/6/77
Signal Generator, RF, H.P.	612A	6/23/77
Peak Power Meter, Boonton	8900B	9/19/77
Pulse Generator, Data Pulse	110B	5/12/77
Counter, Fluke	1953	8/12/77
Half-Ampl. Det. Montek	131500-702	N/A
RF Detector, Montek	135203-100	N/A
Monitor Ant., Montek	006300	N/A
Test Box - Interconnection - Montek	131500-703	N/A
Power Supply HP	6274B	1/16/78
Power Supply Acopian		12/9/77
Power Supply, Sorensen	QR4075A	9/19/77
Directional Coupler 20 dB, Narda	3042B	N/A
Directional Coupler 10 dB, Microlab	CBA-78	N/A
Variable Attenuator, Weinschel 0-10 dB	905	N/A
RF Attenuator, Weinschel	10 dB	N/A
Multimeter, Fluke	8120A	8/2/77
Salt Fog Chamber, Industrial Pump	CA-1	N/A

ATTACHMENT 2

DATA SHEETS

131500-415

June 30, 1976

APPENDIX IV-K

DATA SHEET
ENVIRONMENTAL TEST

TEST Salt Fog

SYSTEM 003

DATE from 2 May 1977 to 4 May 1977

ACCEPTABLE X

NOT ACCEPTABLE

REMARKS At the conclusion of the salt fog test, the system operated properly. There was no degradation in performance based upon comparison of test data. Listed are the noted mechanical discrepancies observed during visual inspection. Mechanical Engineering is presently evaluating the parts for corrective action and resolution prior to production.

Note: The items noted as discrepant on the tripod had deteriorated during humidity, and acceleration or further degradation occurred during salt fog testing.

DISCREPANCIES Tripod--The spring pin, P/N MS16562-216, shows evidence of rust.

The thumb screw, P/N 910569-001, shows evidence of rust.

The 1/4 turn fastener D-Ring, P/N 930048, used for mounting the receiver-transmitter to the tripod is rusted.

DC Filter-The MS35650-304 nut used for mounting clamp 919594-001 shows evidence of rust.

The mounting clamp 910594-001 shows minor evidence of rust at the spot welds.

SIGN OFF INFORMATION

ENVIRONMENTAL TEST ENGINEER _____ DATE _____

REPRESENTATIVE ENGINEER B D Dayton DATE 5-11-77

QA REPRESENTATIVE M. B. Grant DATE 5-11-77

DCASD OR AF CONCURRENCE [illegible] DATE 5-11-77

DATA SHEET

OPERATIONAL TESTS

AN/TRN-41 (Continued)

SALT FOG

Para. No.	Description	5/2/77 Pre Test mBL	5-4-77 Test	5/6/77 Post Test mBL	Requirements	Units
6.4.5.3	Correct north Burst – 12 pulse pairs spaced 30 ± 0.1 μs	✓	✓	✓	Check if OK	
6.4.5.5	Delay 60 ± 10 μs – 135 Hz trig to first burst pulse	✓	✓	✓	Check if OK	
6.4.5.6	Correct Aux burst – 6 pulse pairs spaced 24 ± 0.1 μs	✓	✓	✓	Check if OK	
6.4.6.5	RT replies to 3300 interrogations	2750 ~~2155~~	2544	2556	≥2310 (Counts/Sec	
6.4.6.7	Demand only mode – times to switch from ON to STBY within 70 seconds	✓	✓	✓	Check if OK	
6.4.6.8	STBY mode	✓	✓	✓	Check if OK	
6.4.6.9	Demand Only mode – time to switch from STBY to ON ~~5/10~~ 20 sec ✓ 4/19/77	✓	✓	✓	Check if OK	
6.4.6.10	ON AIR mode	✓	✓	✓	Check if OK	
6.4.7.1	DME ONLY mode	✓	✓	✓	Check if OK	
6.4.7.2	Switch from DME to TACAN	✓	✓	✓	Check if OK	
6.4.8.1	Antenna Alarm – Within four seconds	✓	✓	✓	Check if OK	
6.4.8.2	Alarm Reset	✓	✓	✓	Check if OK	
6.4.8.3	RT Alarm – Within five seconds	✓	✓	✓	Check if OK	
6.4.8.4	Alarm Reset	✓			Check if OK	

June 30, 1976

DATA SHEET

OPERATIONAL TESTS

AN/TRN-41

Test ~~PRE~~ SALT FOG

Date 5-2-77

System 003
001 Tripod D.C. Fuse 001
004 Antenna
001 RT

Time 1:20 PM.

Tech Wm Thomas Wm Thomas Wm Thomas

Para. No.	Description	5-2-77 Pre Test mBh	5-4-77 2:30 PM Test	5/6/77 Post Test mBh	Requirements	Units
6.1	Calibrated RF insertion loss					
	P_L = 31.5 dB	N/A	N/A	N/A	N/A	N/A
	Used in determining peak power.					
6.2	System turn on normal operation	✓	✓	✓	Check if OK	N/A
6.3.1	Antenna radiated signal					
	15 Hz	✓	✓	✓	Check if OK	N/A
	135 Hz	✓	✓	✓	Check if OK	N/A
6.3.2	Antenna Speed	66.668	66.661	66.667	66.667 ± .133	ms
6.4.1.1	Correct identity code	✓	✓	✓	Check if OK	N/A
6.4.1.2	Identity period	✓ 37.0	37.0	38.3	37.5 ± 3.75	Seconds
6.4.2	Peak power	75mw	84mw	80mw ✓		
	(1) Reading of peak power meter Pm =				N/A	Volts
	(2) Convert to dBm – 10 log Pm x 10^3 = Pm dBm	18.75 dBm	19.24 dBM	19.03 dBM	N/A	dBm
	Total power output in dBm PmdBm + L_L =	50.25 dBm	50.74 dBm	50.50 dBM	50 dBm	dB
	*Insertion loss see 6.1 above.					
6.4.3.3	Pulse count	7188	7204	7191	7200 ± 180	Counts
5.4.4.2	Pulse shape					
	Width (50%)	3.6 µs	3.6 µs	3.6 µs	3.5 ± 0.3	µs
	Rise time (10–90%)	2.1 µs	2.1 µs	2.0 µs	2 ± 0.25	µs
	Fall time (90–10%)	2.5 µs	2.4 µs	2.5 µs	2.5 ± 0.5	µs
6.4.4.4	Pulse spacing	12.0 µs	12.0 µs	12.0 µs	12.0 ± 0.1	µs
4.5.2	Delay – 60 ± 10 µs 15 Hz trig to first burst pulse.	✓	✓	✓	Check if OK	

E 3113A

FACILITY: Salt Fog

ENVIRONMENTAL DATA SHEET
ENVIRONMENTAL LABORATORY — DEPT. 330

A.O. 298K-193	ENV. TECH. R.K. Davis		TEST SCHED.
ENGINEER OR Q.C. M. Rogers (E systems)	PHONE		TEST COMPLETED
TECHNICIAN	PHONE		TEST REMOVED
UNIT TITLE AN/TRN-41	SER.	QTY.	TOTAL UTILIZATION

INSTRUCTIONS TO OPERATOR

TEST TO TERMINATE: BY:

1. Conduct Test per procedure I
   A. 5% solution
   B 48 hr Test period
   C Ph range 6.5 - 7.2

TEST Salt Fog

SPEC. Mil-std-810

PAR. Method 509

ENVIRONMENTAL LABORATORY SUPERVISORS APPROVAL

D.W. Black
SIGNATURE

DATE

DATE	TIME	CHRONOLOGICAL RECORD OF TEST	INITIALS (PRINT)
5/2/77	0745	Preheat Salt fog chamber for 24 hrs at 95°F.	DWB
5/2/77	0900	mix 5% solution of NaCl and Water and adjust	
		ph range to 6.5 to 7.2.	DWB
5/2/77	0830	place AN/TRN-41, Antenna and RT in Salt Spray	
		Chamber for 48 hrs	DWB
5/2/77	1000	check range of ph 6.9	DWB
5/4/77	0830	Remove from chamber and wash with water.	DWB
		Temp. was 68°F.	

VERIFIED & RELEASED BY: _____ Q.C. OR PROGRESS _____ COGNIZANT ENGINEER